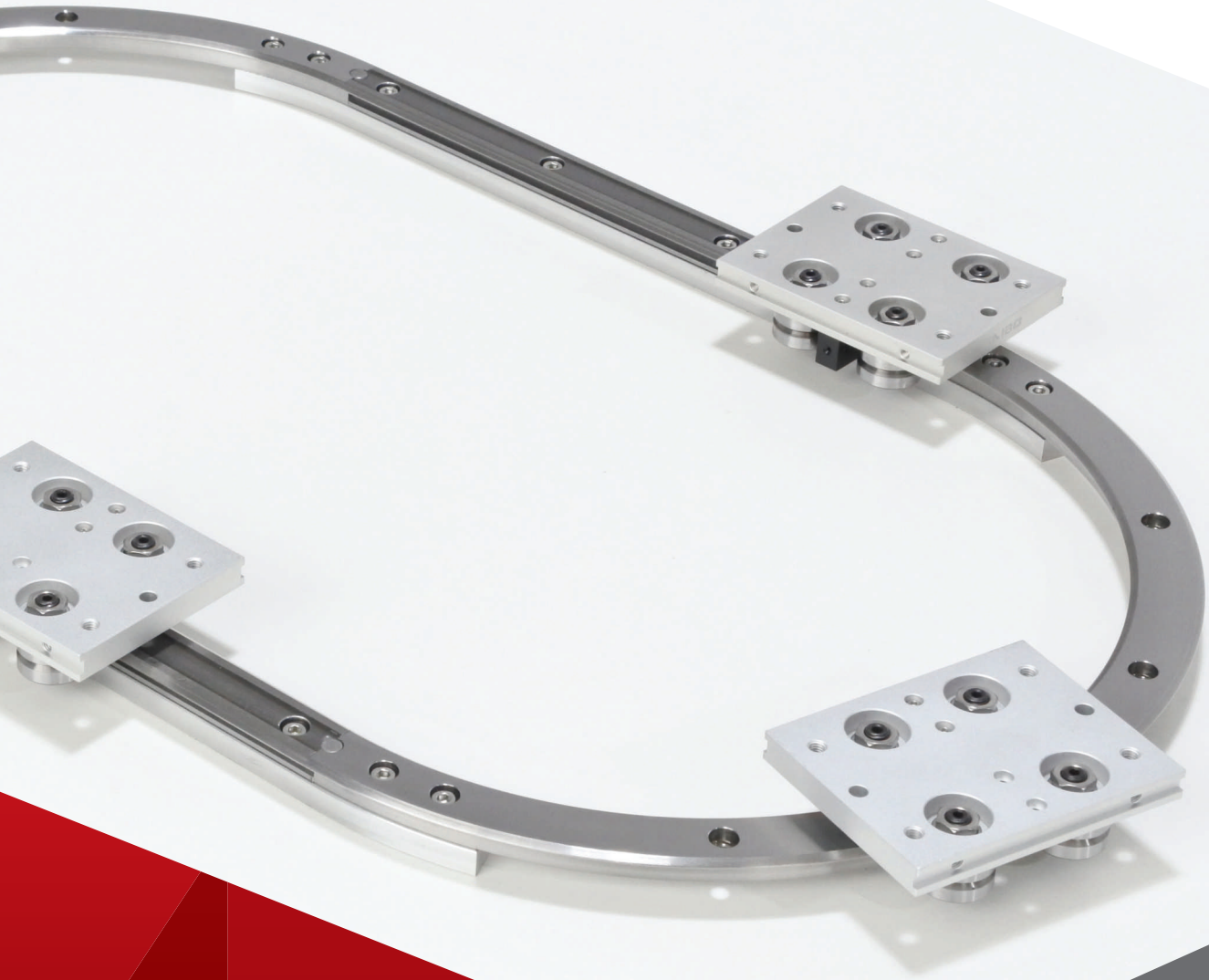


**SAIBO**  
Innovation in Motion



**CURVED RAIL**



## About US

SAIBO is one of world recognized leaders in design and manufacturing of curve rail. SAIBO products are exported to over 30 countries and regions. We provide not only standard products, but also customized solutions. SAIBO means “Always reach for higher goals.” SAIBO is committed to excellence and linear motion innovation while guaranteeing its customers the best pricing in our industry.

SAIBO actively seeks to work with you on your next design and we promise the following:

- The right product for your application
- A quality product you can trust
- Engineering assistance that is proven and world renown.

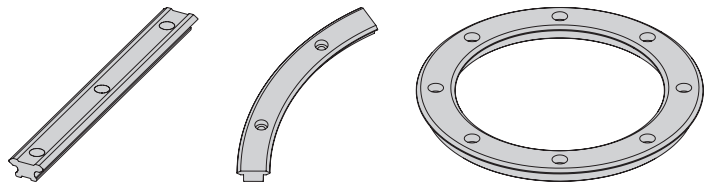
SAIBO is located in WUXI, east China. Wuxi is famous for being one of the birthplaces of Chinese modern industry. Welcome you visit us.

## Straight Rail

Made of Germany high quality bearing steel  
 Deep hardened in working surfaces for high wear resistance  
 Ground Double 70° V working edges together to ensure parallelism  
 Soft rail body for customization machining process  
 Provide 3 standard sizes for customer's selection  
 Two precision rails G1 and G3 is optional, ground and un-ground  
 Precision G3 rail length could be up to 5.5 meters without connection  
 Longer length (Unlimited) can be achieved by Connection

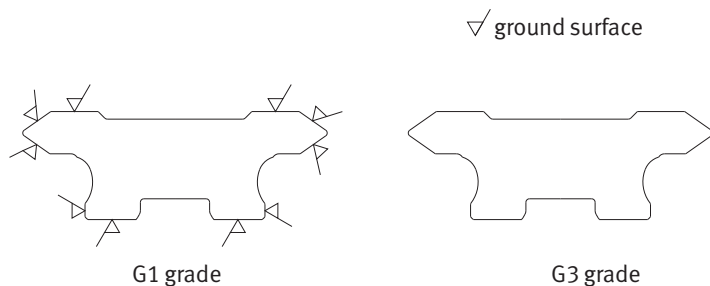
## Ring Rail

Made of high quality bearing steel  
 Deep hardened in working surfaces for high wear resistance  
 Ground Double 70° V working edge ensure parallelism  
 All surfaces are ground for precision  
 Provide wide range of standard sizes  
 Customized assembly holes are available



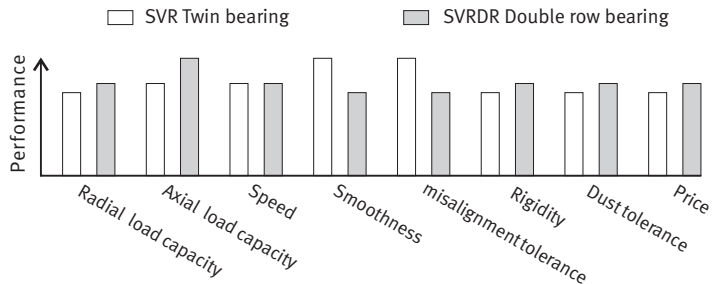
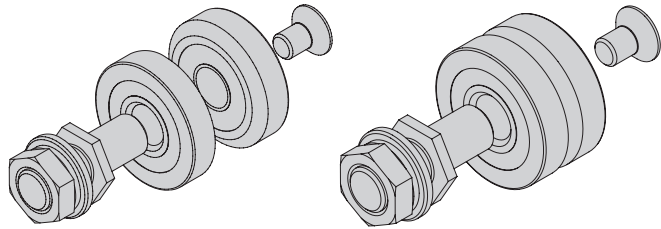
## Precision

SAIBO provides two precision grades. G1 ground and G3 unground. Here we must emphasize that G3 grade's motion is also very smooth and stable. It is fit for smooth running without very high precision and low cost request. But when linear rail connect ring rail, it must be G1 grade.



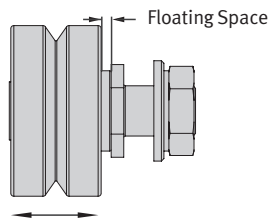
**Rollers**

Made of high quality bearing steel  
 Whole body hardened for high wear resistance  
 Supply Twin and Double row bearings  
 (See below figure)  
 Concentric / Eccentric bolt supplied

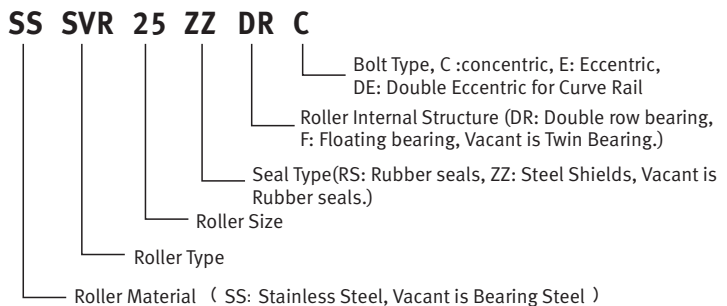


**Floating Bearing**

Outer ring could float in axial direction to compensate installation parallelism  
 Made of high quality bearing steel  
 Whole body hardened for high wear resistance  
 Concentric / Eccentric bolt supplied



**Roller Type Selection**



Roller Type Selection Please refer to page P11-P12.

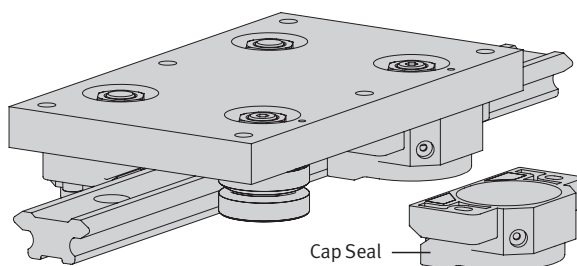
## Cap Seal

Protect bearing against dust

Protect operator for safety

Lubricated felt wiper contact rail's working surface to increase load capacity and life

Standard and interchangeable



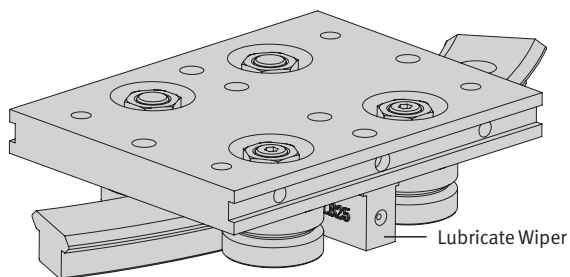
## Lubricate Wiper

Lubricated felt wiper contact rail's working surface to increase load capacity and life

Lubricated felt wiper is pushed lightly by a small spring to ensure low friction with the rail's working surface

Easy to fill lubricate oil from its fill hole

Standard and interchangeable



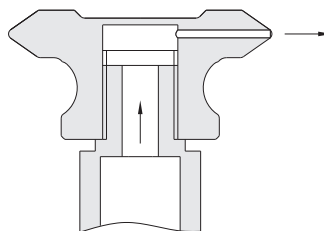
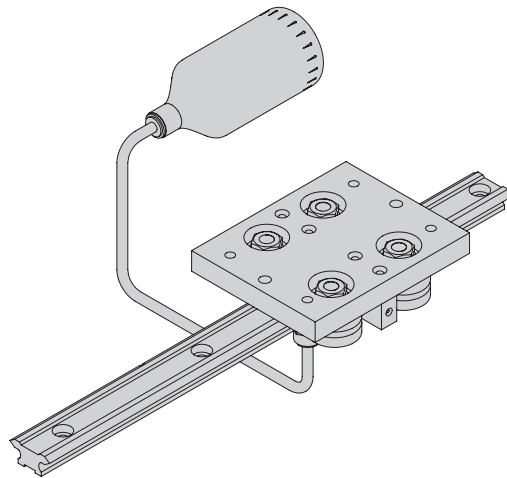
**Lubricate** Lubricated felt wiper contact rail's working surface to increase load capacity and life

Lubricated felt wiper is pushed lightly by a small spring to ensure low friction with the rail's working surface

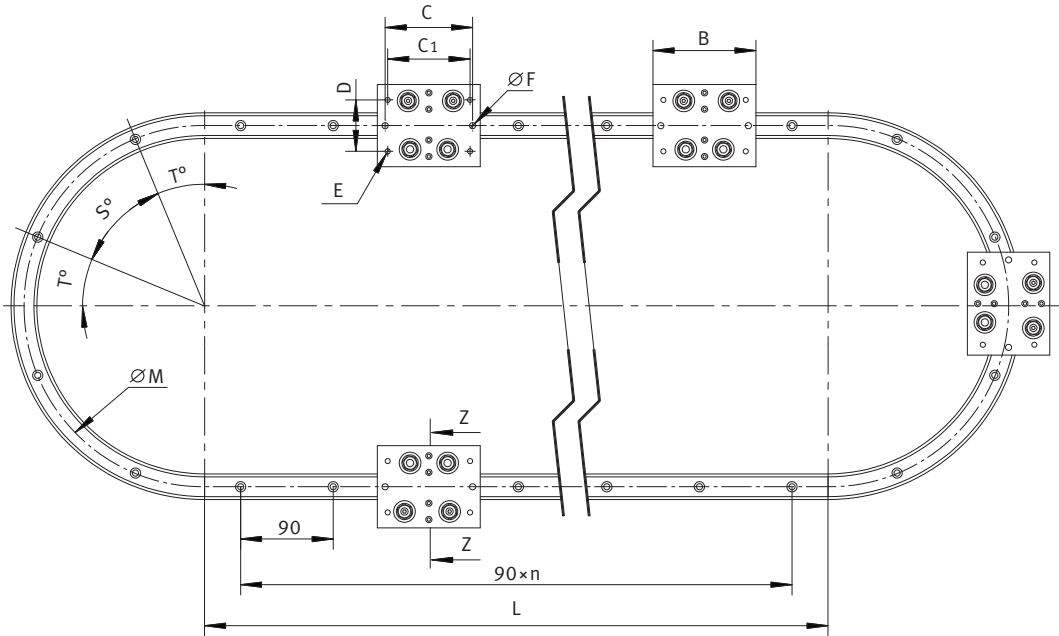
Oil charging holes supplied for the Track Motion System

Automatic lubricate bleed could connect to the rail's oil charging holes very easily.

Standard and interchangeable

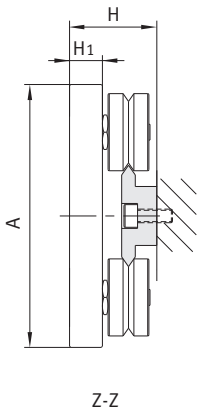


## Oval Rail



Assembly code	Components			A	B
	Straight Rail	Ring Rail	Carriage		
<b>SB-LGV25XL-CR25 159 R180</b>	<b>SB-LGV25XL</b>	<b>CR25 159 R180</b>	<b>SRC25 159</b>	80	95
<b>SB-LGV25XL-CR25 255 R180</b>		<b>CR25 255 R180</b>	<b>SRC25 255</b>		100
<b>SB-LGV25XL-CR25 351 R180</b>		<b>CR25 351 R180</b>	<b>SRC25 351</b>		105
<b>SB-LGV44XL-CR44 468 R180</b>	<b>SB-LGV44XL</b>	<b>CR44 468 R180</b>	<b>SRC44 468</b>	116	145
<b>SB-LGV44XL-CR44 612 R180</b>		<b>CR44 612 R180</b>	<b>SRC44 612</b>		150
<b>SB-LGV76XL-CR76 799 R180</b>	<b>SB-LGV76XL</b>	<b>CR76 799 R180</b>	<b>SRC76 799</b>	185	190
<b>SB-LGV76XL-CR76 1033 R180</b>		<b>CR76 1033 R180</b>	<b>SRC76 1033</b>		210
<b>SB-LGV76XL-CR76 1267 R180</b>		<b>CR76 1267 R180</b>	<b>SRC76 1267</b>		250
<b>SB-LGV76XL-CR76 1501 R180</b>		<b>CR76 1501 R180</b>	<b>SRC76 1501</b>		270



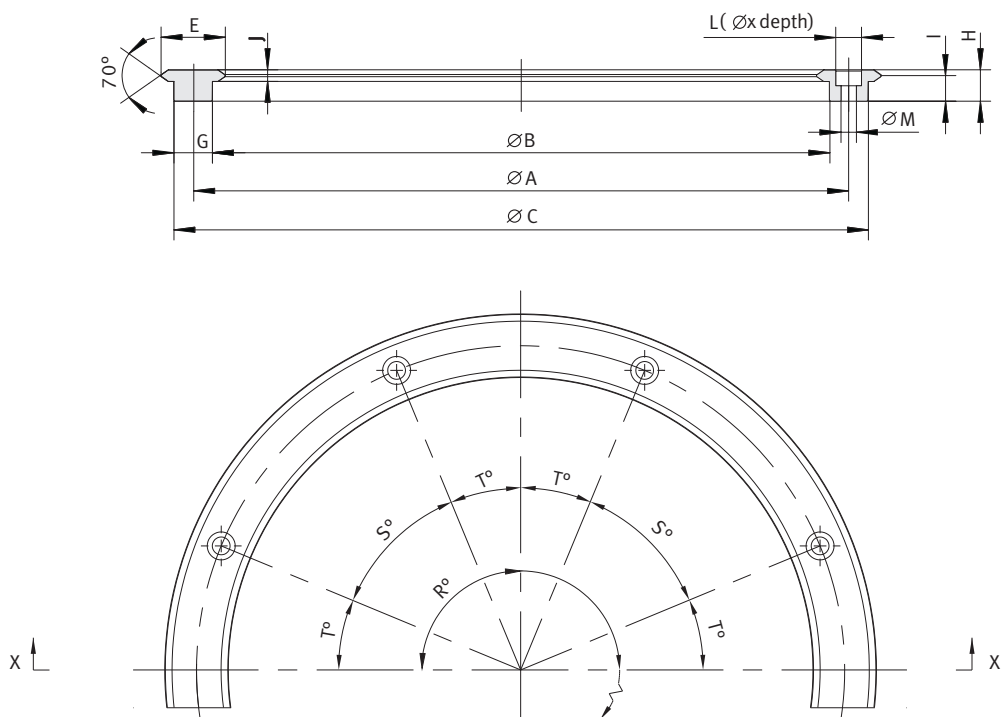


**Type Code**

<b>SB- LGV 25 X2000 -CR25 159 R180</b>
Segment angular: 180°
Ring railway diameter
Ring railway size
Railway length
Railway size
Linear railway
SAIBO motion symbol

Dimension									
C	C1	D	E	∅F	H	H1	M	S°	T°
80	85	50	4xM6	2-∅6	30.5	11.5	159	45	22.5
85	80		4xM6	2-∅6			255	45	22.5
90	85		4xM6	2-∅6			351	30	15
125	120	75	4xM8	2-∅8	38.5	14.5	468	30	15
130	125		4xM8	2-∅8			612	22.5	11.25
165	160	100	4xM10	2-∅10	58.5	20	799	22.5	11.25
185	180		4xM10	2-∅10			1033	18	9
225	205		4xM10	2-∅10			1267	18	9
245	225		4xM10	2-∅10			1501	18	9

## Ring Rail



Type	Applicable Bearing	A	B	C	E	G	H
<b>CR25 159</b>	SVR-25	159	144	174	25	15	12.25
<b>CR25 255</b>	SVR-25	255	240	270	25	15	12.25
<b>CR25 351</b>	SVR-25	351	336	366	25	15	12.25
<b>CR44 468</b>	SVR-34	468	442	494	44	26	15.5
<b>CR44 612</b>	SVR-34	612	586	638	44	26	15.5
<b>CR76 799</b>	SVR-54	799	749	849	76	50	24
<b>CR76 1033</b>	SVR-54	1033	983	1083	76	50	24
<b>CR76 1267</b>	SVR-54	1267	1217	1317	76	50	24
<b>CR76 1501</b>	SVR-54	1501	1451	1551	76	50	24

## Type Code

**CR25 351 R180 (N)**

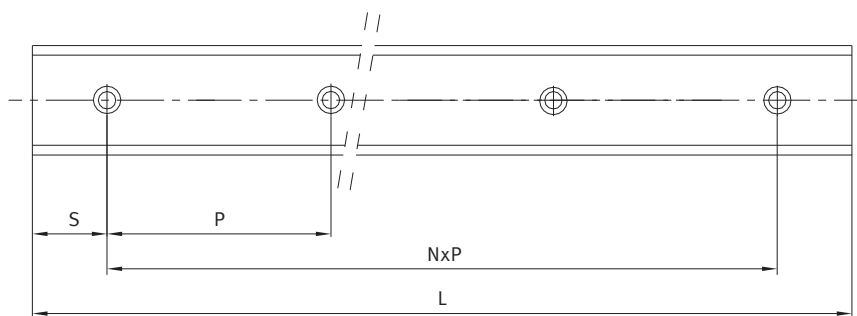
Screw holes option

Segment angular 90°、180°、full 360° Ring

Ring rail size

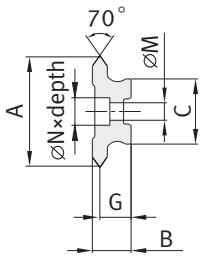
I	J	L ( $\varnothing$ ×depth)	$\varnothing$ M	Hole Number (R=360°)	Hole Position $\pm 0.2$		Weight (kg) (R=360°)
					S°	T°	
10	4.5	10x6	6	8	45	22.5	0.77
10	4.5	10x6	6	8	45	22.5	1.2
10	4.5	10x6	6	12	30	15	1.65
12.5	6	11x7	7	12	30	15	5.1
12.5	6	11x7	7	16	22.5	11.25	6.7
19.5	9	20x13	11	16	22.5	11.25	25
19.5	9	20x13	11	20	18	9	32
19.5	9	20x13	11	20	18	9	41
19.5	9	20x13	11	20	18	9	48.7

## Straight Rail



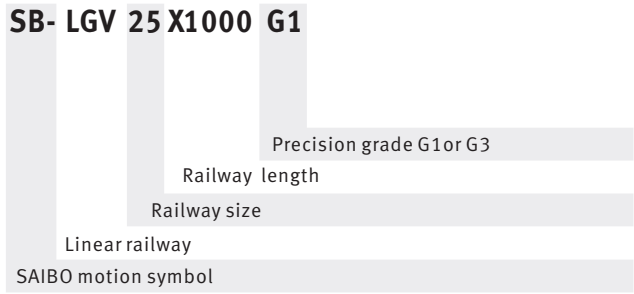
Type	A		B		C	
	G1	G3	G1	G3	G1	G3
<b>SB-LGV25XL</b>	25	25.12	12.25	12.85	15	15.5
<b>SB-LGV44XL</b>	44	44.12	15.5	16.1	26	26.5
<b>SB-LGV76XL</b>	76	76.12	24	24.6	50	50.5

**Type Code**



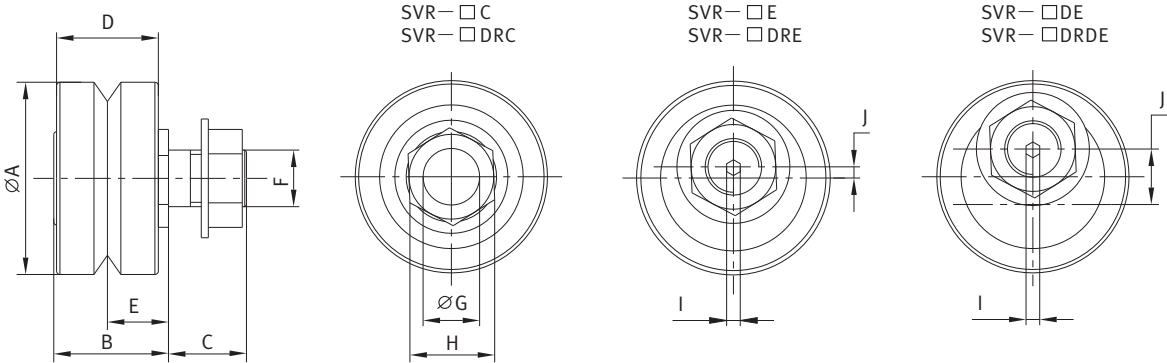
**G1**

**SB- LGV 25 X1000 G1**

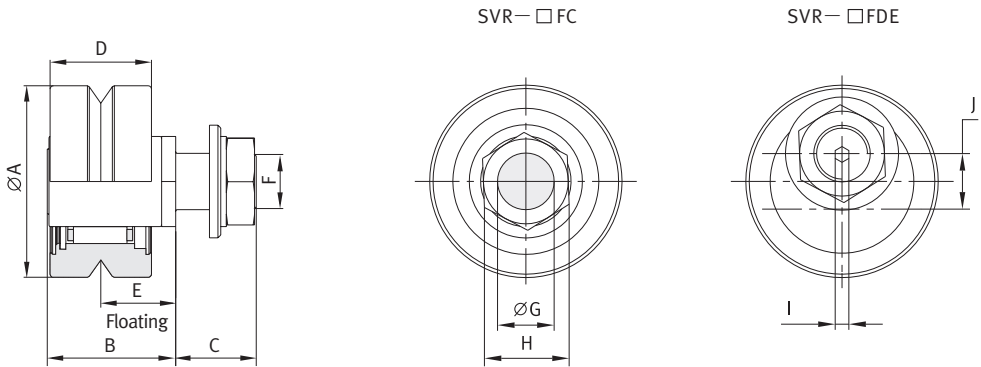


G		M	N x depth	P	S	Lmax	
G1	G3					G1	G3
10	10.25	6	10x6	90	45	2000	5500
12.5	12.75	7	11x7	90	45	2000	5500
19.5	19.75	11	20x12	90	45	1900	5500

## Rollers



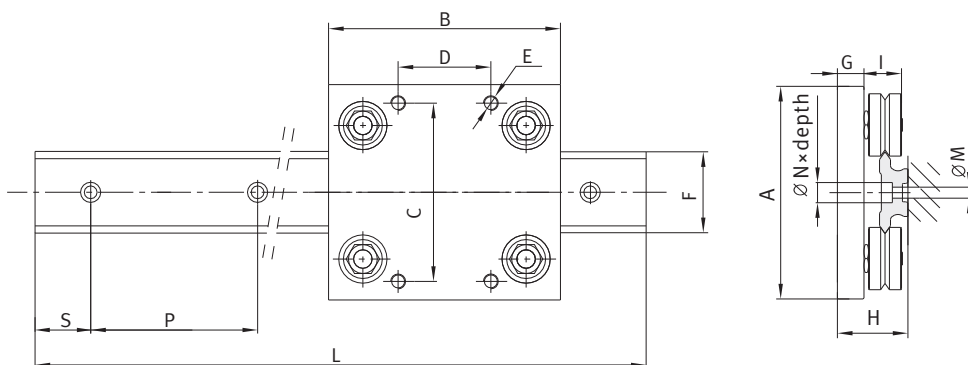
Type	Roller Category	Outer Diameter A	Eccentric Distance J	Bearing Load Capacities(N)			
				Radial		Axial	
				Co	C	Co	C
<b>SVR-25C</b>	Twin bearing	25	-	1320	3320	330	800
<b>SVR-25E</b>			0.75				
<b>SVR-25DE</b>			2				
<b>SVR-25DRC</b>	Double row bearing		-	2535	7710	840	1650
<b>SVR-25DRE</b>			0.75				
<b>SVR-25DRDE</b>			2				
<b>SVR-25FC</b>	Floating bearing		-	6150	4980	-	-
<b>SVR-25FDE</b>			2				
<b>SVR-34C</b>	Twin bearing		34	-	2630	5980	560
<b>SVR-34E</b>		1					
<b>SVR-34DE</b>		2.5					
<b>SVR-34DRC</b>	Double row bearing	-		5260	9690	1380	2540
<b>SVR-34DRE</b>		1					
<b>SVR-34DRDE</b>		2.5					
<b>SVR-34FC</b>	Floating bearing	-		12600	11000	-	-
<b>SVR-34FDE</b>		2.5					
<b>SVR-54C</b>	Twin bearing	54		-	6700	13700	1180
<b>SVR-54E</b>			1.5				
<b>SVR-54DE</b>			5.5				
<b>SVR-54DRC</b>	Double row bearing		-	13400	22200	2800	4650
<b>SVR-54DRE</b>			1.5				
<b>SVR-54DRDE</b>			5.5				
<b>SVR-54FC</b>	Floating bearing		-	29000	21300	-	-
<b>SVR-54FDE</b>			5.5				



Dimension								
B	C	D	E		F	G	H	I
16.5	11.3	14	9		M8	8	13	3
18.1	11.3		Max 10.5	Min 9				
21	14.3	18	11.5		M10	10	15	4
23.2	14.3		Max 13.5	Min 11.5				
33.5	19.8	28	19		M14	14	27	6
37.2	19.8		Max 21.6	Min 19				

Notes: SAIBO currently applied twin bearings by default.

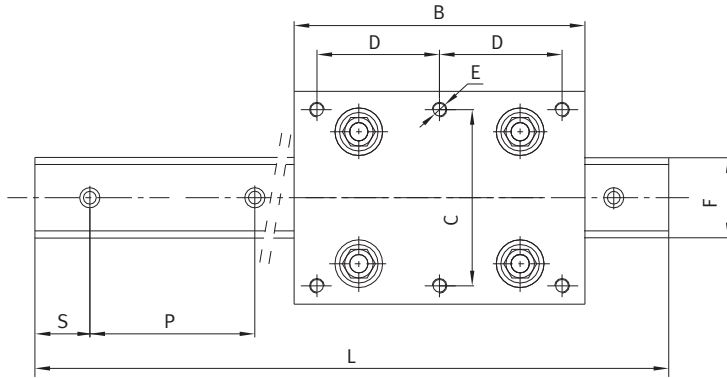
## Linear Guide



SLCA

Rail	Carriage	Roller	Dimension					
			A	B	C	D	E	F
SB-LGV25XL	SLC25A	SVR-25C	80	80	65	24	4xM6	25
	SLC25B	SVR-25E		135		60	6xM6	
	SLC25C			180		82	6xM6	
SB-LGV44XL	SLC44A	SVR-34C	116	125	96	50	4xM8	44
	SLC44B	SVR-34E		180		80	6xM8	
	SLC44C			225		103	6xM8	
SB-LGV76XL	SLC76A	SVR-54C	185	200	160	90	4xM10	76
	SLC76B	SVR-54E		300		135	6xM10	
	SLC76C			400		185	6xM10	





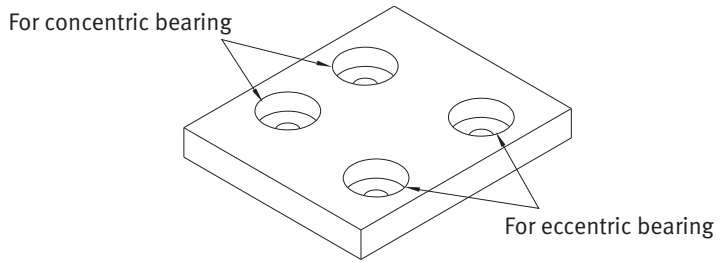
**SLCB/C**

G	H		I	M	N x depth	P	S	Lmax	
	G1	G3						G1	G3
11.5	30.5	30.75	16.5	6	10x6	90	45	2000	5500
14.5	38.5	38.75	21	7	11x7	90	45	2000	5500
20	58.5	58.75	33.5	11	20x12	90	45	1900	5500

## Assembly manual

### 1. Match rollers to carriage plate

Please mount the concentric bearing to one side of carriage plate, and eccentric bearing to the other side following the direction of railway. In case of circle motion carriage, the concentric bearing should be mounted to the side where mounting-hole distance is shorter. Please refer to below picture.



Circle motion carriage plate

### 2. Mounting to railway

Carriage assembly should be mounted from the end of railway. Please do not put any overstress when mounting.

### 3. Adjust the clearance between bearing and railway

- Tighten concentric bearings first.
- Then rotate eccentric bearing via rotate hexagonal key at the end of stud to adjust the clearance between railway and bearing.
- Adjust the clearance to zero.
- Slide the carriage by hand and adjust to the extent where there causes a slight slipping resistance.

Correct condition is where moving power becomes the recommended value as below table by putting load by push-pull gauge to the running direction of carriage.

#### Recommended pre-load by push-pull gauge

V track bearing size	Pre-load(N)
25	4
44	8
76	12

-Keep eccentric bearing's position and tighten the nut.

### Important note

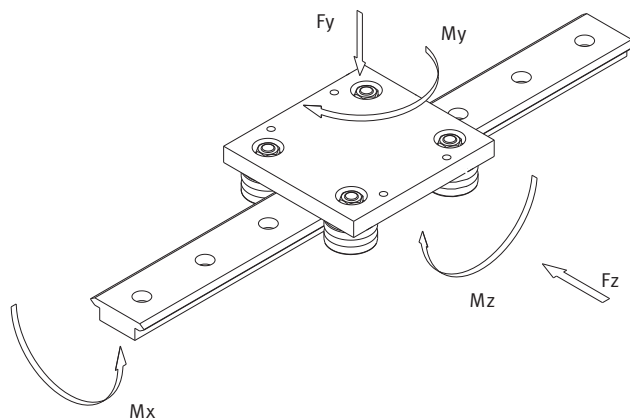
Appropriate pre-load provide the system rigidity. However, over preload will decrease system's life rapidly. Please be careful.

### Load / Life calculation

Due to the hardness of the railway and fatigue analysis of railway and roller, the railway's life does not determine the system life. It is determined by roller's life. Load capacity of the motion guide system varies mainly by the size of bearing and railway, lubricated or not, and the load magnitude and direction. Other factors include speed and acceleration and environment etc. To calculate system life, loading factor LF should be calculated firstly. Here we provide two methods to calculate the loading factor.

### Standard 4 bearings carriage calculation

If the system use SAIBO standard 4 bearings carriage, then calculation can use below formula.



$$LF = \frac{F_y}{F_{y\max}} + \frac{F_z}{F_{z\max}} + \frac{M_x}{M_{x\max}} + \frac{M_y}{M_{y\max}} + \frac{M_z}{M_{z\max}}$$

F<sub>y</sub> - Actual load in Y direction. (N)

F<sub>z</sub> - Actual load in Z direction. (N)

M<sub>x</sub> - Actual moment in X direction. (N·m)

M<sub>y</sub> - Actual moment in Y direction. (N·m)

M<sub>z</sub> - Actual moment in Z direction. (N·m)

Below parameters can be taken from the table of Load capacity.

F<sub>y max</sub> - Max load capacity in Y direction. (N)

F<sub>z max</sub> - Max load capacity in Z direction. (N)

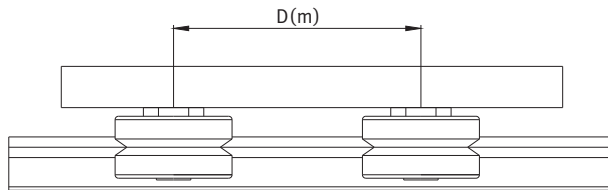
M<sub>x max</sub> - Max moment capacity in X direction. (N·m)

M<sub>y max</sub> - Max moment capacity in Y direction. (N·m)

M<sub>z max</sub> - Max moment capacity in Z direction. (N·m)

### Straight rail carriage's load capacity

Carriage Type	Dry system Double Row Bearings and Twin Bearings					Lubricated system/Twin Bearings					Lubricated system/Double Row Bearings				
	Fy	Fz	Mx	My	Mz	Fy	Fz	Mx	My	Mz	Fy	Fz	Mx	My	Mz
	N	N	Nm	Nm	Nm	N	N	Nm	Nm	Nm	N	N	Nm	Nm	Nm
<b>SLC25</b>	410	410	4.6	200xD	200xD	1300	1225	14	600xD	640xD	1610	3020	18.2	1500xD	800xD
<b>SLC44</b>	790	790	16	400xD	400xD	3250	2830	65	1400xD	1600xD	3620	6050	74	3000xD	1800xD
<b>SLC76</b>	1850	1850	65	900xD	900xD	7250	6380	255	3200xD	3600xD	10050	10050	365	5000xD	5000xD

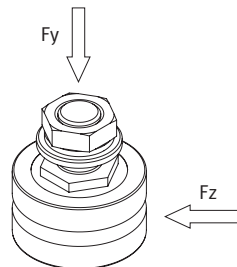


### Ring rail carriage's load capacity

Carriage Type	Dry system Double Row Bearings and Twin Bearings					Lubricated system/Twin Bearings					Lubricated system/Double Row Bearings				
	Fy	Fz	Mx	My	Mz	Fy	Fz	Mx	My	Mz	Fy	Fz	Mx	My	Mz
	N	N	Nm	Nm	Nm	N	N	Nm	Nm	Nm	N	N	Nm	Nm	Nm
<b>SRC25 159</b>	410	410	4.6	8.7	8.7	1300	1225	14	25.5	27.5	1610	3020	18.2	65	33.5
<b>SRC25 255</b>	410	410	4.6	8.2	8.2	1300	1225	14	23.5	25.5	1610	3020	18.2	60	31.5
<b>SRC25 351</b>	410	410	4.6	8.7	8.7	1300	1225	14	24.5	27.5	1610	3020	18.2	64	33.5
<b>SRC44 468</b>	790	790	16	28.2	28.2	3250	2830	65	97	112	3620	6050	74	215	120
<b>SRC44 612</b>	790	790	16	28	28	3250	2830	65	100	110	3620	6050	74	225	130
<b>SRC76 799</b>	1850	1850	65	87	87	7250	6380	255	305	345	10050	10050	365	480	480
<b>SRC76 1033</b>	1850	1850	65	105	105	7250	6380	255	365	415	10050	10050	365	580	580
<b>SRC76 1267</b>	1850	1850	65	122	122	7250	6380	255	425	480	10050	10050	365	680	680
<b>SRC76 1501</b>	1850	1850	65	138	138	7250	6380	255	490	550	10050	10050	365	780	780

#### Roller load factor

If the system does not use SAIBO standard 4 roller carriage, It is necessary to calculate each roller's loading factor. Biggest loaded roller's load determines the system's life.



$$LF = \frac{F_y}{F_{y\max}} + \frac{F_z}{F_{z\max}}$$

LF - Loading factor

**LF should be less than 1.0 for any combination of load**

F<sub>y</sub> - Actual axial capacity. (N)

F<sub>z</sub> - Actual radial capacity. (N)

Below parameters can be taken from below table.

F<sub>y max</sub> - Max axial load. (N)

F<sub>z max</sub> - Max radial load. (N)

**Roller's load capacity** Please refer to page 11.

**Life calculation** After getting Loading Factor LF, the life in km can be calculated by selecting one of below two formulas. The basic life can be taken from table below.

**Dry system**

$$\text{Life(km)} = \frac{\text{Basic\_life}}{(0.03+0.97LF*f)^2}$$

**Lubricated system**

$$\text{Life(km)} = \frac{\text{Basic\_life}}{(0.03+0.97LF*f)^3}$$

**Basic life**

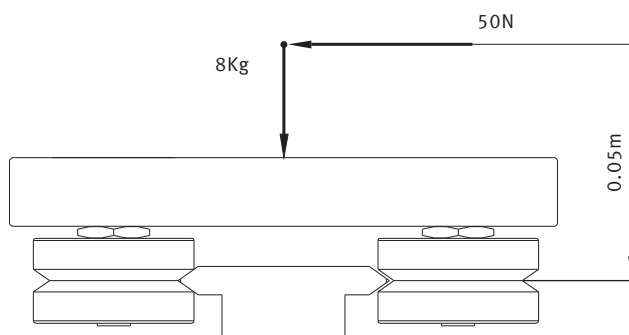
Bearing type	Dry system	Lubricated system
SVR-25	100	150
SVR-34	100	150
SVR-54	150	250

f - Reduction coefficient of the application and environment.

None vibration or shock, Low speed (<1m/s), Low frequency shift direction, clean environment.	1-1.5
Light vibration or shock, medium speed (1-2.5m/s) medium frequency shift direction, some dirtiness	1.5-2
Heavy vibration or shock, high speed (>2.5m/s) high frequency shift direction, heavy dirty	2-3.5

### Calculation example

A machine use SB-LGV25 spacer railway and standard carriage. The carriage and work-piece total weight 8 kg. When the carriage moving, there is an external load of 50 N exerted as below drawing. Working environment is clean. There is none vibration or shock.



The load factor LF is  
calculated use formula

$$LF = \frac{F_y}{F_{y\max}} + \frac{F_z}{F_{z\max}} + \frac{M_x}{M_{x\max}} + \frac{M_y}{M_{y\max}} + \frac{M_z}{M_{z\max}}$$

$$F_y = 8\text{kg} \times 9.8 \text{ (gravity)} = 78.40 \text{ N}$$

$$F_z = 50 \text{ N}$$

$$M_x = 50 \times 0.05 = 2.5 \text{ N}\cdot\text{m}$$

$$M_y = 0$$

$$M_z = 0$$

Take parameters  $F_y \max$ ,  $F_z \max$ ,  $M_x \max$ ,  $M_y \max$ ,  $M_z \max$  from table and then fill in the formula

$$LF = \frac{78.4}{1280} + \frac{50}{1200} + \frac{2.5}{14} + \frac{0}{M_{y\max}} + \frac{0}{M_{z\max}} = 0.2816$$

Then life (km) calculation can use formula as below:

### Dry system

$$\text{Life(km)} = \frac{\text{Basic\_life}}{(0.03+0.97LF*f)^2}$$

Basic life is 100km.

According to the description of working condition, take  $f=1.3$ .

$$\text{Life(km)} = \frac{100}{(0.03+0.97*0.2816*1.3)^2} = 674\text{km}$$

### Lubricated system

Basic life is 150 km, take  $f=1.1$

$$\text{Life(km)} = \frac{\text{Basic\_life}}{(0.03+0.97LF*f)^3}$$

$$\text{Life(km)} = \frac{150}{(0.03+0.97*0.2816*1.1)^3} = 4155\text{km}$$

From this example, it shows clearly that lubrication is so important for the life. Please pay attention to install the lubrication system for your system.

**WUXI SAIBO INDUSTRY CO LIMITED**  
6-701 XIHU EAST ROAD, WUXI 214011, CHINA  
Tel: +86-510-8230 0095  
Fax: +86-510-8230 0096

[www.saibo-bearing.com](http://www.saibo-bearing.com)  
[info@saibo-bearing.com](mailto:info@saibo-bearing.com)



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